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NEBC MEETING NEWS

May 2004. President Art Gilman introduced this year's Distinguished Speaker, Dr. Charles Sheviak, from the New York State Museum in Albany. His talk was titled "An Orchidological Odyssey: Systematics in a Well-known Group." Chuck, who discovered his interest in botany as a fourth grader hunting for bugs, has since spent many years ironing out the wrinkles in orchid taxonomy.

His first project, which focused on populations of *Spiranthes* in the western U.S., set him off along a chain of new discoveries. Based on an old specimen from Great Basin, Utah, he located plants in Colorado that turned out to be a new species, *S. diluvialis*, intermediate between *S. magnicamporum* ($2n = 30$) and *S. romanzoffiana* ($2n = 44$). *Spiranthes diluvialis* is an allopolyploid with a chromosome number of $2n = 74$, exactly the sum of the diploid genomes from each of its parents. He later found other plants in Arizona that looked similar to *S. magnicamporum*, but turned out to be a second new species, *S. delitescens*. While looking for *S. delitescens*, he checked out reports of *S. romanzoffiana* from desert wetlands in Nevada. The plants turned out to be another new species, *S. infernalis*.

Work with the genus *Spiranthes* led him to a second orchid genus, *Platanthera*. In New York he encountered populations of two different taxa of what he referred to as "BGPs," or Basic Green *Platanthera*. Both were identified as *P. hyperborea*, though they did not appear to match the description of that species. Further investigation showed that populations in the eastern U.S. were allotetraploid ($4n$). They have since been reclassified as *P. huronensis*, which differs from other species in the genus by the higher positioning of the anthers, preventing autopollination. Remarkably, the eastern diploid plants were found to be from an undescribed species, now *P. aquilonis*.

Chuck has also spent a significant amount of time studying the genus *Cypripedium*, searching in particular for species that look similar to our native Lady's Slipper, but that have unique flower coloration. He has found three varieties of *C. parviflorum* so far, but notes that there is still much to be resolved in the taxonomy of this species. The most widespread, var. *pubescens*, can be highly variable in shape and size, the result of both phenotypic and genotypic variation. A second variety, originally known as var. *parviflorum*, has since been renamed var. *makasin*. It can be recognized by its small-flowered plants, found in fens, that have a distinct, fruity scent. Chuck found that they were quite unlike the true var. *parviflorum*, a southeastern species with a different

floral spotting pattern and a faint, rose-like scent. His favorite *Cypripedium* species is *C. montanum*, native to the Pacific Northwest. It hybridizes with *C. parviflorum* to form *C. ×columbianum*. Molecular studies showed that there was gene flow between the two parent species in the distant past. Interestingly, there is also current hybridization due to habitat destruction caused by logging, permitting *C. parviflorum* to move into the more montane habitat of *C. montanum*.

Chuck's studies have taken him as far as Vladivostok, near the Pacific coast of Russia. There, he found *Cypripedium macranthos* and *C. calceolus* crossing to create a series of hybrids that show all of the characters of the North American *C. parviflorum* complex. This suggests that the origin of *C. parviflorum* could have been from an ancient hybridization event that took place in Asia. Chuck found a 1:1 correlation in morphology and color patterns between the Vladivostok hybrids and *C. parviflorum* var. *pubescens*; only the intensity of the coloration varied. The variation in *C. parviflorum* var. *pubescens* may be an expression of an ancient hybrid progenitor.

Chuck ended his talk with some beautiful images of *Platanthera leucophaea* (Eastern Prairie Fringed Orchid), a very rare species. He collected specimens from Illinois and North Dakota, noting that the western plants had fewer but larger flowers. Growing them together, Chuck was surprised when the Illinois and North Dakota plants both flowered on the same day, allowing him to make a precise comparison. He noted that though the plants are both pollinated by sphingid moth species, their flowers are structured so that they each place their pollinarium on a different part of the moth. This ensures that there is no cross-pollination between the two flower types, an indication that the plants are in fact separate species. Chuck described the more western plants from the Missouri River drainage and northward as *P. praeclara*, the Western Prairie Fringed Orchid.

—Jennifer Forman Orth, Recording Secretary.

May 23–26, 2004 Southern Appalachian Field Trip. Members of the NEBC and the Southern Appalachian Botanical Society (SABS) held a joint field meeting at the Valle Crucis Conference Center in Valle Crucis, North Carolina. The group divided each day and collectively completed at least three different botanical rambles on each of the three days. The assembled group of NEBC and SABS members were kept well fed and comfortable by the staff of the Valle Crucis

Conference Center. The nightly happy hour before the early dinner was, unfortunately, often missed by botanists who dallied too long on the trails! Evening speakers Edward Schell, Dan Pittillo, and Peter White provided beautiful images of endemic plants, an introduction to the ecology of the region, and interesting new data on the glacial and post-glacial distribution of plant communities in the Southern Appalachians, respectively. The final evening was devoted to identification workshops with Lisa Standley and Bruce Sorrie co-leading one on sedges while Alan Weakley and Zack Murrell helped others with any non-sedge vascular plant identifications. The following accounts reflect the highlights of the woods in the vicinity of the Inn, as well as three of the daily outings, with an admitted bias toward sedges.

Valle Crucis Inn—The group discovered rich woods behind the Valle Crucis Inn, which provided some of the best botanizing of the trip. Thickets of *Rhododendron maximum* and *R. calendulaceum* were under a canopy of *Tsuga canadensis*, *Liriodendron tulipifera*, *Acer saccharum*, *A. rubrum*, *Quercus rubra*, *Robinia pseudoacacia*, and *Magnolia fraseri* (in bloom). These woods held a nice diversity of herbaceous species. Some of the taxa in bloom included *Aplectrum hyemale*, *Panax quinquefolius*, *Conopholis americana*, *Orobanche uniflora*, *Houstonia purpurea*, *Sedum ternatum*, *Listera smallii*, *Clintonia unbellulata*, *Salvia lyrata*, *Hydrangea arborescens*, *Coreopsis major*, *Gillenia trifoliata*, *Viola rotundifolia*, *V. hastata*, and *Aristolochia macrophylla* (with pipevine swallowtails). The trails and grounds of the inn also provided good birding.

Day 1, Roan Mountain—Alan Smith led a long, leisurely hike up the grassy bald at Roan Mountain, ending in a rocky heath bald. The grassy bald areas were dominated by *Carex pensylvanica* and *C. brunnescens*, with *C. debilis*; not by grasses! The trail crossed through some interesting patches of spruce-fir-*Sorbus* woods with *Ribes glandulosum* and *Cardamine clematitis*. The grassy balds themselves had few flowering species at this time of year (*Erythronium umbilicatum*, *Anemone quinquefolia*) but leaves and developing shoots of other species held promise of exciting swathes of bloom later in the summer, dominated by *Angelica triquinata*, *Solidago glomerata*, *S. roanensis*, and *Lilium grayi*. Heath areas were dominated by *Rhododendron catawbiense* and *R. carolinianum*, not yet in bloom. Among the many shrubs of *Vaccinium* we found *V. erythrocarpum*, a highbush blueberry with a cranberry flower. At the rocky outcrop we found leaves of the rare endemic *Geum radiatum* and cushions of blooming *Leiophyllum buxifolium*. High-elevation birds were also common in the woods and shrub thickets.

Day 2, Bluff Mountain—Alan Weakley and Jamey Donaldson led two groups to Bluff Mountain, a Nature Conservancy preserve. Bluff Mountain is a flat plateau bordered by rocky cliffs and outcrops above a rich, sloping, deciduous woods. The lower woods were dominated by maple, ash, and yellow birch with a variety of spring ephemerals just past flower (*Cardamine*, *Dicentra*, *Claytonia*, *Laportea*, *Asarum*, and *Viola* spp.) while the woods on the plateau were dominated by red and white oak, buckeye, and stands of *Tsuga caroliniana* on the edges of cliffs. The varied habitats (rock outcrops, meadows, dry heath/oak woods, rich woods, seeps and fens) gave the group a wonderful look at diverse and rare plants. In the heath areas, *Rhododendron catawbiense* was just starting to bloom. *Menziesia pilosa* was a highlight of the shrub heaths. In the more mesic woods on top of the plateau we found a new (to us) *Trillium*, *T. sulcatum*. Meadows were in bloom with *Iris cristata*, carpets of vivid orange *Castilleja coccinea*, *Senecio aureus*, and vividly magenta *Geranium maculatum* (not our northern pale pink). A seep held *Cypripedium parviflorum*. Cliffs were covered with leaves of *Geum radiatum*, the rare and spectacular *Carex misera*, *Phlox subulata*, *Houstonia montana*, *Saxifraga michauxii*, and *Asplenium montanum*. *Paronychia argyrocoma* was abundant, to the delight of Alice Schori, who has searched for it in New Hampshire. Wet meadows were dense with several species of *Liatris* (including the rare *L. helleri*) and gentians, likely to be spectacular later in the season. A large fen dominated by sedges (*Carex*, *Cladium mariscoides*, *Eleocharis*, *Eriophorum*) revealed a patch of *Carex aquatilis*, not previously recorded in North Carolina. *Carex roanensis*, another rare endemic, was abundant along road edges in the lower wooded slopes.

Day 3, Grandfather Mountain—Jamey Donaldson led a small but intrepid group from the summit of Grandfather Mountain along the Profile Trail, to the base of the mountain. The steep and rigorous scramble over rocky summits, up rock chutes, and under huge boulders was often aided by ladders and fixed ropes. Despite the 50 mph winds, the group enjoyed wonderful views and great plants. The rocky cliffs along the ridge had abundant patches of *Carex misera*, large billows of *Leiophyllum buxifolium* in flower, and tussocks of *Trichophorum caespitosum* clinging to the cliff faces. On the lower slopes of the mountain we found large patches of *Diphylleia cymosa* in bloom, along with *Saxifraga careyana*, *Viola canadensis* (pink, rather than white), and *Hydrophyllum virginianum* with vivid, deep purple flowers. Understory plants included *Aconitum*, *Coreopsis*, *Rudbeckia laciniata*, *Laportea*, *Dioscorea*, *Phlox*, *Claytonia*, *Dicentra*, *Allium tricoccum*,

Dentaria, *Trillium grandiflorum* and *T. erectum*, and *Viola* species. *Cymophyllus fraseri* and *Carex plantaginea* were highlights of the lower trail. At the base of Grandfather Mountain, we paid our respects at the two historical markers honoring famous botanists who visited the mountain: André Michaux and Asa Gray.

—Lisa A. Standley.

May 2004. Council member Ray Angelo introduced the evening's speaker, Dr. Jim Hinds. A former neuroscientist and present accountant from Orono, Maine, Dr. Hinds became interested in lichens through courses at Eagle Hill Biological Station. These initial courses have led him to wide-ranging studies in New England, which were the topic of his talk "New England Lichens: Ecology, Distribution, and Changes in Abundance During the Last 100 Years"

Dr. Hinds began his talk with a review of different lichen groups, including crustose (closely adherent to rock), foliose (attached by rhizees on their lower surface), squamulose (a few mm in size and often growing on other lichens), fruticose (stick into the air and have no differences on their two surfaces), and hanging lichens. Lichens also fall into two major groups based on their fungi: ascomycetes and basidiomycetes. The lichen form evolved two separate times, once from each group of fungi. Most lichens in New England are ascomycetes.

Ecologically, lichens are very important. Lichens colonized land about 1.2 billion years ago and were the only group on land until the mosses arrived. Dr. Hinds hypothesized that they may have affected global levels of CO_2 and O_2 and thus facilitated life on Earth. Lichens help with soil formation from bare rock due to mechanical effects of their hyphae working in the interstitial spaces of rocks. Historically, lichens were important in nitrogen fixation, particularly in alpine areas, on calcareous rocks and soils, and in old-growth forests. For example, in the Pacific Northwest, *Lobaria* species fix over 50% of nitrogen in old-growth forests. Lichens are also important in food chains, serving as food for invertebrates, flying squirrels (spotted owl food), boreal red-backed voles, white-tailed deer, and caribou.

Humans have used lichens in many ways, but most importantly as old-growth forest indicators and as biomonitors of air pollution. Lichens are particularly sensitive to SO_2. Zone charts have been developed for New England and the British Isles, where, by using lichen indicators, scientists can determine the amount of air pollution in a specific location. In New

England, sensitive lichens are most common in Maine, where they are least affected by air pollution coming from midwestern states.

As a result of comparisons Dr. Hinds has made with the well-known lichen flora of the British Isles, he feels that the macrolichens (all but the crust lichens) are well known in New England since there are similar numbers in each geographic region. The known crust lichens in New England, however, are about half the numbers known from the British Isles and more field work is needed to adequately inventory these species. He ultimately expects that lichen species numbers will be about 2/3 that of vascular plants in New England.

Macrolichens were well studied in New England in the 1800s and more recently since 1980. Dr. Hinds has compared state distributions of lichens from these two periods and has noticed some interesting trends. Eighteen species of macrolichens once found in three or more states are now found in none. Thirteen of these are sensitive to air pollution, particularly the nine species of cyanolichens (lichens that host cyanobacteria). Among the 40 species that are absent in three states or more, 21 are cyanolichens and 18 are old-growth indicators. For all but three of these species, Maine is one of the remaining states where the lichens are found, which is most likely attributable to its higher air quality. For New England in general, three species of macrolichens are historic, two species are G1 (five or few locations), six species are G2 (20 or few locations), and 10 species are G3 (100 or fewer locations). Two hundred and sixty species of New England macrolichens (57%) are considered to be rare or declining.

Over the past three years, Dr. Hinds has had a rare opportunity to be part of a collecting team for lichens and mosses on Mt. Katahdin. Through this field inventory, they have discovered nine lichen species new to North America, 31 species new to New England, 18 species new to Maine, and 93 species new to Mt. Katahdin. Many of these species are crust lichens that are hard to collect and thus have been under-surveyed in the past. Dr. Hinds concluded his talk by commenting that the results of intense surveys, such as that undertaken on Mt. Katahdin, demonstrate that there is much to be discovered with an increase in effort. Also, more studies are needed on lichen floristics, ecology, and distribution. He encouraged the audience to switch from studying vascular plants to lichens in order to do new and interesting work!

—Karen B. Lombard, Recording Secretary, *pro tempore*.